NARRATIVE IN SUPPORT OF SITE PLAN REVIEW FOR A PROPOSED STUDENT HOUSING BUILDING AT MERRIMACK PLAZA LOWELL, MA 01852

PREPARED FOR:

VISION DEVELOPMENT, INC.
401 EAST ELM STREET, SUITE 150
CONSHOHOCKEN, PENNSYLVANIA 19428

PREPARED BY:

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P.O. BOX 1088
LAKEVILLE, MASSACHUSETTS 02347

APRIL 15, 2016

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1.0 INTRODUCTION

It is proposed to construct a student housing building on the former site of the Lowell Five Cents Savings Bank (Subject Property) off of French Street in Lowell, MA. The work requires Site Plan Review by the Lowell Planning Board. This document has been prepared in support of that petition.

2.0 EXISTING CONDITIONS

The following subsections provide information regarding the location, setting, history, and environmental condition of the Subject Property. Photographs of the Subject Property and pertinent characteristics are included in Appendix A.

2.1 Site Location and Description

Address: 1 Merrimack Plaza, 2 French Street, and 14 French Street
Lowell, Massachusetts 01852

Assessor's Info: 1 Merrimack Plaza Parcel ID: 0158-4055-0001-0000 (1.81 acres)
2 French Street Parcel ID: 0158-2465-002-0000 (0.01 acres)
14 French Street Parcel ID: 0158-2465-0014-0000 (0.43 acres)

Latitude/Longitude: 42°58'35"N, -71°18'36"W

Relative Location: 1 Merrimack Plaza is located approximately 170 feet north of the intersection of Post Office Square and French Street, and 2 and 14 French Street are located approximately 100 feet east of the intersection of French Street and Post Office Square.

Current Owner: Lowell Five Cent Savings Bank
34 John Street, PO Box 440
Lowell, Massachusetts 01853

2.2 Description and Current Use of Subject Property

The Subject Property is comprised of three (3) parcels, totaling 2.25 acres, located east/northeast of the intersection of French Street and Post Office Square in Lowell, Massachusetts. A two-story, 86,000 square foot concrete building with a finished basement and granite stone facade (Site Building) is located on the central portion of 1 Merrimack Plaza. The majority of the remainder of the Subject Property is covered with bituminous concrete with landscaped islands. A canal (the Merrimack Wasteway Canal) is present between the 1 Merrimack Plaza and the French Street parcels.

The Site Building is currently vacant, and is heated by natural gas. Municipal water, sewer, natural gas, electrical, and telecommunications utilities service the Site Building.

In general, the Subject Property and grounds are well kept.

3.0 PROPOSED IMPROVEMENTS

It is proposed to demolish the existing building and haul unsuitable material to a licensed disposal site. The pavement and building slabs will be crushed and either used as aggregate on-site or hauled to a proper off-site facility. The site will then be graded as shown on the plans and the student housing building will be constructed as shown on the plans.

4.0 SITE PLAN REVIEW CRITERIA

The following subsection presents how the proposed facility meets the Site Plan Review criteria.

4.1 The Building

The proposed building is a five story, u shaped structure with a central courtyard. The proposed building will have 156 apartment units. Some units will have 2 bedrooms while others will be 3 and 4 bedroom units. There will be a total of 438 beds. The first floor will have several lobbies, meeting rooms, a gaming room, a computer room and study rooms. The facade will have vertical and horizontal articulation to break up the exterior face. There will be a vertical glass treatment adjacent to the elevator shafts and the elevator shafts will be outfitted with a tower that extends above the main roof line reminiscent of the mill towers. The main building entrance will feature a covered drop-off area and a 30 foot wide glass entrance to the main lobby. The central courtyard will be a combination of hard scape and vegetated areas with appropriate seating areas.

4.2 Parking and Loading

Other than two handicap spaces, no parking is proposed on the Merrimack Plaza parcel. The 48 existing parking spaces on the French Street parcel will be retained. The handicap spaces are being provided closest to the building entrance as required by MA Architectural Access Board regulations. The two handicap spaces on the French Street parcel will be converted to non-handicap standard parking spaces. In addition, the City of Lowell Parking Department has committed to allocating 180 parking spaces (pass card agreements). Refer to the February 4, 2016 letter from Nicholas Navin, Parking Director, which is presented in Appendix B. A shuttle service consisting of mini buses and vans will transport residents to and from all of the nearby colleges. In addition, there is adequate public transportation available including bus and taxi cabs.

Four loading spaces are required by the zoning ordinance for dormitories with over 300 rooms. Two

are being provided at the northwest corner of the building and two are provided just east of the circular drop off area.

4.3 Traffic Flow and Circulation

A traditional Traffic Impact and Access Study (TIAS) is not appropriate for this site since the vast majority of the trips to and from the proposed student housing will not be by cars. The trips will be by University shuttle buses, Lowell Regional Transit Authority (LRTA) buses, by bicycle and by walking. The University shuttle service runs from 7 a.m. to 7 p.m. on all weekdays. In addition, it operates for the following evening, weekend and holiday hours:

Monday - Wednesday: 7 p.m. to 2 a.m.
Thursday and Friday: 7 p.m. to 2:30 a.m.
Saturday: 9 a.m. to 2:30 a.m.
Sundays and Holidays: 9 a.m. to 2 a.m.

The Lowell Regional Transit Authority (LRTA) has bus service from 6 a.m. to 6 p.m. In spite of individual vehicle trip computations not being relevant to this assessment, the peak number of trip ends is still relevant. The Project will entail the development of a 438 bedroom community that will be designed and marketed to serve students at Lowell colleges. In order to develop the traffic characteristics of the Project, trip-generation statistics published by the Institute of Transportation Engineers (ITE) for a similar land use as that proposed were used. ITE Land Use Code (LUC) 220, *Apartment*, with the independent variable of "persons" equal to 438, was used to develop the trip characteristic of the Project. The number of persons residing in the community was based on the number of bedrooms provided and represents a reasonable baseline from which to assess the impact of the Project (vs. the number of residential units proposed). Using the above methodology, the Project is conservatively (high) expected to generate approximately 950 trips on an average weekday (two-way, 24-hour volume, or 475 vehicles entering and exiting), with approximately 78 vehicle trips (21 vehicles entering and 57 exiting) expected during the weekday morning peak-hour and 113 vehicle trips (87 vehicles entering and 26 exiting) expected during the weekday evening peak-hour.

The higher education learning institutions to the south and east of the proposed student housing, include Middlesex Community College, the Lowell Academy of Hair Design, and the Lincoln Technical Institute. These institutions have primarily commuters living at home or have small student populations, therefore, relatively few trips (15%) are expected to be eastbound or southbound from the proposed student housing. The University of Lowell, which is to the west, is projected to be the destination of 85 percent of the trips. The weekday morning peak-hour would have 48 westbound trip ends per hour and 18 eastbound vehicles per hour. During the weekday evening peak-hour, there would be 74 eastbound vehicle trip ends and 22 westbound vehicles. The projected trip rates above are for all trips including UMass shuttle buses, LRTA buses, bicycle trips and pedestrian trips. On clear sunny days, it is estimated that up to 40 percent of the trips will be bicycle

and pedestrian. Conversely, on bitter cold or stormy days, the majority of trips are projected to be shuttle bus trips. Since the proposed student housing will house a significant school population and since the circular drop off area is under roof and protected by the weather, it is projected that the University shuttle service will locate a stop at the student housing entrance. The City of Lowell has already developed an outstanding bicycle lane system along the Merrimack River and is establishing a bicycle lane along the main roadways. There are also good sidewalk systems that are handicap accessible throughout the area.

4.4 External Lighting

Low level lighting will be provided in the central courtyard. Wall packs will light the walkways to the south and east of the building. All lights will be shielded to prevent glare to abutting properties. They will all be night sky friendly.

4.5 Landscaping and Screening

Suitably scaled landscaping will be provided around the proposed building and in the central courtyard. There is an existing 3 foot high evergreen hedge along the north side of the trolley tracks which will be preserved. This provides a visual and physical separation between the trolley tracks and the proposed Grass Pave lawn. Grass Pave is a commercial plastic grid that is filled with soil and planted with lawn seed. It is an all season surface that can take fire truck loads. Efforts will be made to preserve the mature pine trees that adjoin the Merrimack Wasteway Canal on the east end of the property. Ornamental shrubs are proposed along the northern property line.

4.6 Utilities

The site is currently serviced with municipal water and sewer. It is also currently serviced with gas, telephone, electric and cable. The stormwater is currently collected by a series of catch basins and piped to the Merrimack Wasteway on the east end of the site. The proposed building will be serviced by all of the above noted underground utilities. The stormwater from the paved driveways will be treated with a First Defense treatment system prior to being discharged (refer to Appendix C).

4.7 Snow Removal

Small snowfalls will be plowed to the side of the access drives. Snow blowers will be utilized to clear all of the on-site sidewalks. Large snowfalls will be loaded on trucks and hauled off site.

5.0 ENVIRONMENTAL IMPACT

The following subsections briefly present the environmental impact of the proposed development.

5.1 Wetland Resources

The water quality of the storm runoff will be improved by removing the existing parking lot and adding a stormwater treatment system. The volume and rate of runoff will be decreased since some impervious area is being removed and replaced by permeable landscaping.

5.2 Habitats

There are no priority habitats of rare species, no estimated habitats of rare wildlife and no certified vernal pools at or near the site in accordance with the MA Natural Heritage and Endangered Species Program.

5.3 Air

The facility will be heated with natural gas with high efficiency units. There will be no other source of air pollution, therefore, there will be no significant impact on air.

5.4 Groundwater

Laboratory analysis of groundwater samples that were recently collected from on-site monitoring wells indicated no evidence of environmentally impaired groundwater. The proposed improvements will maintain that good groundwater quality.

5.5 Historic and Archaeological Resources

There are no historic or archaeological resources on site. The Subject Property is located in the Lowell Historic District and approval from the Lowell Historic Board is required and being sought.

5.6 Hydrologic Impact

Almost the entire 2.25 acres currently consist of bituminous concrete and building roof. All of the runoff is collected by a series of shallow sump catch basins. The subsurface piping runs from basin to basin and discharges at the east property line into the Merrimack Wasteway. Hydrologic computations under pre-development and post-development conditions are presented in Appendix D. Under existing conditions, these are 53,349 square feet of impervious areas. Under the proposed development, there will be a slight increase to 55,561 square feet. The hydrologic runoff curve number (RCN) is 90 under both conditions. As a result, the hydrologic computations indicate no increase in the rate or volume of runoff.

6.0 CONCLUSION

There will be no environmental impacts from the proposed development. The proposed student housing meets all of the Site Plan Review criteria. It will provide a needed facility on a currently abandoned site.

APPENDIX A

PHOTOGRAPHS

Merrimack Plaza
Lowell, MA

Existing Building Looking North

Trolley Tracks on South Side

Merrimack Plaza
Lowell, MA

Existing Building Looking East

APPENDIX B

CITY OF LOWELL PARKING DEPARTMENT LETTER

City of Lowell Parking Department
75 John Street • Lowell, MA 01852
P: 978.674.4017 • F: 978.970.4044
www.LowellMA.gov

Nicholas Navin
Parking Director

February 4, 2016

To: Vision Properties
401 East Elm Street, Suite 150
Conshohocken, PA 19428

RE: Allocated Parking Spaces

This letter is to confirm that The City of Lowell Parking Department will allocate 180 pass card agreements for parking in the municipal parking facilities in support of the proposed project at 1 Merrimack Plaza, currently the Lowell Five Headquarters.

Specifically, the 180 allotted pass cards will be partitioned amongst the facilities as follows: 100 spaces at the George Ayotte parking facility, 25 spaces at the Joseph Downes parking facility, 15 spaces at the Edward Early parking facility, 15 spaces at the Leo Roy parking facility, and 25 at the Lower Locks parking facility. These monthly pass cards will allow the card holder 24/7 access to the specific facility they were drawn from. Pass cards are subject to the schedule of fees set by the City Council. Currently, the market rate is $64 per pass card, per month. A group billing discount is available.

Please feel free to reach out if you have any questions.

Sincerely,

Nicholas Navin
Parking Director

CC: Kevin Murphy
Diane Tradd
Judy Tymon
Frank Warren
Patty Livorsi
Dave Croteau

APPENDIX C

STORM TREATMENT SYSTEM

First Defense®

Enhanced vortex separation with high-capacity internal peak flow bypass.

Product Profile

The First Defense® is an enhanced vortex separator that provides effective and economical stormwater treatment for small urban catchments or larger areas where multiple treatment units are used instead of end-of-pipe solutions. It accomodates large pipe sizes and includes an integral high-flow bypass to convey a wide range of flows without washing out previously captured sediment, floatable trash and hydrocarbons.

Components

1. Inlet Grate (optional)
2. Inlet Chute
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Precast Vortex Chamber
6. Internal Bypass
7. Outlet Chute
8. Outlet Pipe
9. Oil and Floatables Storage
10. Sediment Storage Sump

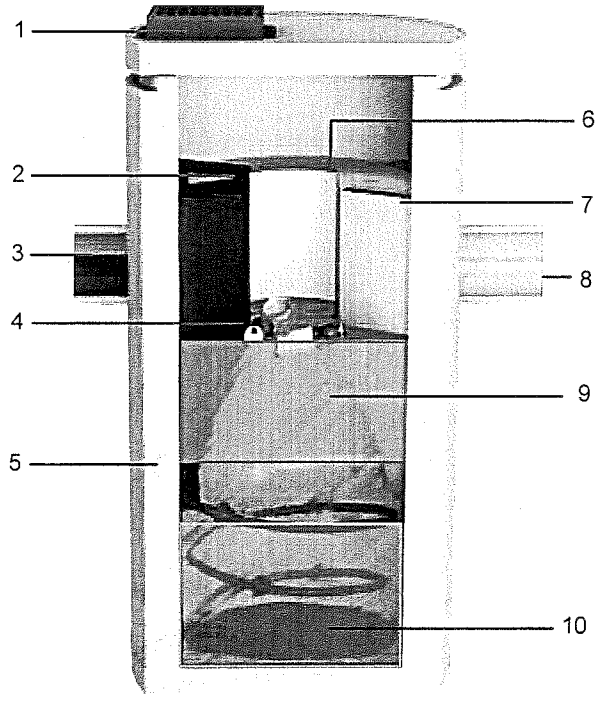


Fig.1 The First Defense® has internal components designed to efficiently capture pollutants and prevent washout at peak flows.

Applications

- Small to medium size catchments
- Residential and commercial developments
- Source control for parking lots and maintenance yards, gas stations, streets, highways, airports and transportation hubs
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate, single inlet pipe or dual inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for "offline" arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 500% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

How it Works

The First Defense® has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons (Fig.1).

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating trash and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An integral bypass conveys infrequent peak flows directly to the outlet chute, eliminating the need for, and expense of, external bypass control structures. Floatables are diverted away from the bypass into the treatment chamber through the floatables draw-off slot.

First Defense®

First Defense® Sizing & Design

Design Options for Inlet and Internal Bypass Arrangements
For maximum flexibility the First Defense® inlet and internal bypass arrangements are available in several configurations (Fig.2a - 2c).

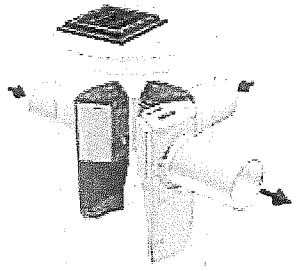


Fig.2a Inlet configurations for all models include options for inlet grates and multiple inlet pipes.

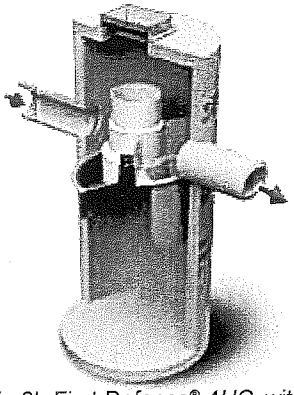


Fig.2b First Defense®-*4HC*, with higher capacity internal bypass and larger maximum pipe diameter.

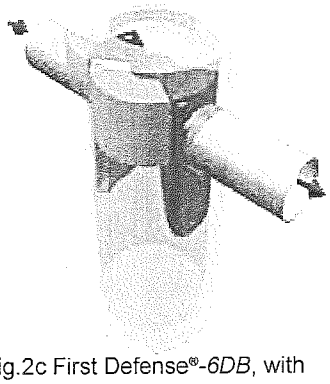


Fig.2c First Defense®-*6DB*, with higher capacity dual internal bypass and larger maximum pipe diameter.

Table 1. First Defense® Models and Design Criteria.

Model Number	Diameter	Typical Treatment Flow Rates for TSS Treatment		Peak Online Flow Rate	Maximum Pipe Diameter	Oil Storage Capacity	Sediment Storage Capacity	Minimum Distance from Outlet Invert to Top of Rim	Standard Distance from Outlet Invert to Sump Floor
		106µm[1]	230µm[2]						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-4	4 / 1.2	0.7 / 20	1.2 / 34	6.0 / 170	18 / 457	180 / 681	1.0 / 0.76	3.5 / 1.07	6.5 / 1.98
FD-4HC	4 / 1.2			20.0 / 566	24 / 600				
FD-6	6 / 1.8	2.2 / 63	3.8 / 108	18.0 / 510	24 / 600	420 / 1,590	3.10 / 2.37	4.0 / 1.22	8.5 / 2.59
FD-6DB	6 / 1.8			25.0 / 708	30 / 762				

[1]Flow rate for >90% removal TSS for target particle size based on D_{50} = 106 micron.

[2]Flow rate for 80% removal TSS for target particle size based on D_{50} = 230 micron.

Maintenance

The First Defense® needs minimal maintenance, but like all structural best management practices maintenance is necessary for the long-term protection of the environment. Pollutants captured by the First Defense® are stored in the sump and on the water surface of the vortex chamber. A commercially or municipally owned sump-vac is used to remove captured sediment and floatables (Fig.2). Pollutant storage capacities are provided below in Table 1.

For more, refer to the comprehensive First Defense® Operation and Maintenance Manual at http://www.hydro-int.com/us/products/first-defense.

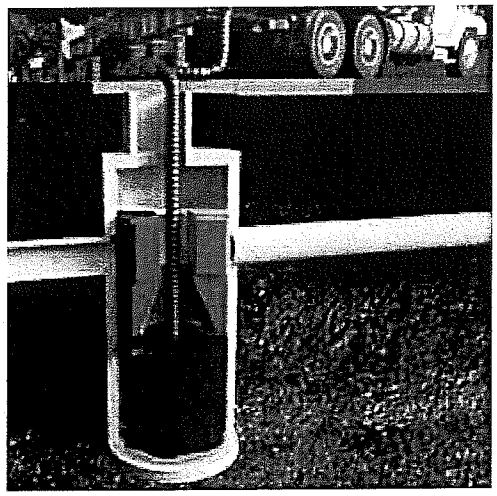


Fig.2 Maintenance is performed with a standard sump vac.

Hydro International, 94 Hutchins Drive, Portland, ME 04102
Tel: (207) 756-6200 Fax: (207) 756-6212
Email: stormwaterinquiry@hydro-int.com Web: www.hydro-int.com

APPENDIX D

HYDROLOGIC COMPUTATIONS

Proposed
Merrimack Plaza
Lowell, Massachusetts

Drainage Summary

2 YR STORM (3.4 in.)

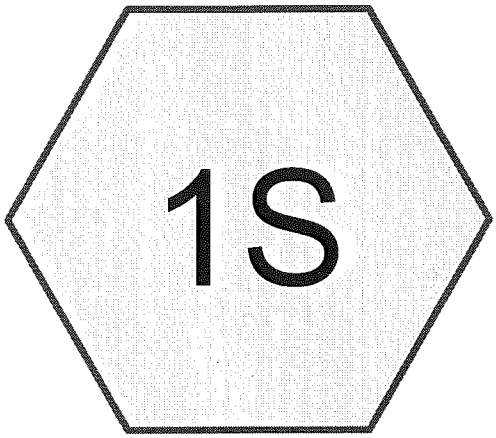
Receptor	Pre Development Q Max (cfs)	Post Development Q Max (cfs)
Wasteway	4.49	4.49

10 YR STORM (4.8 in.)

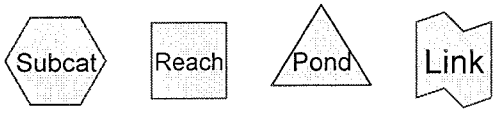
Receptor	Pre Development Q Max (cfs)	Post Development Q Max (cfs)
Wasteway	7.19	7.19

100 YR STORM (7.0 in.)

Receptor	Pre Development Q Max (cfs)	Post Development Q Max (cfs)
Wasteway	10.65	10.65



Pre-Development Condition



Routing Diagram for Pre-Development
Prepared by {enter your company name here}, Printed 4/14/2016

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.636	74	>75% Grass cover, Good, HSG C (1S)
1.225	98	roof, paved, impervious (1S)
1.861	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.636	HSG C	1S
0.000	HSG D	
1.225	Other	1S
1.861		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.636	0.000	0.000	0.636	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	1.225	1.225	roof, paved, impervious	1S
0.000	**0.000**	**0.636**	**0.000**	**1.225**	**1.861**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre-Development Runoff Area=81,059 sf 65.82% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=90 Runoff=4.49 cfs 0.322 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.322 af Average Runoff Depth = 2.08"
34.18% Pervious = 0.636 ac 65.82% Impervious = 1.225 ac

Summary for Subcatchment 1S: Pre-Development Condition

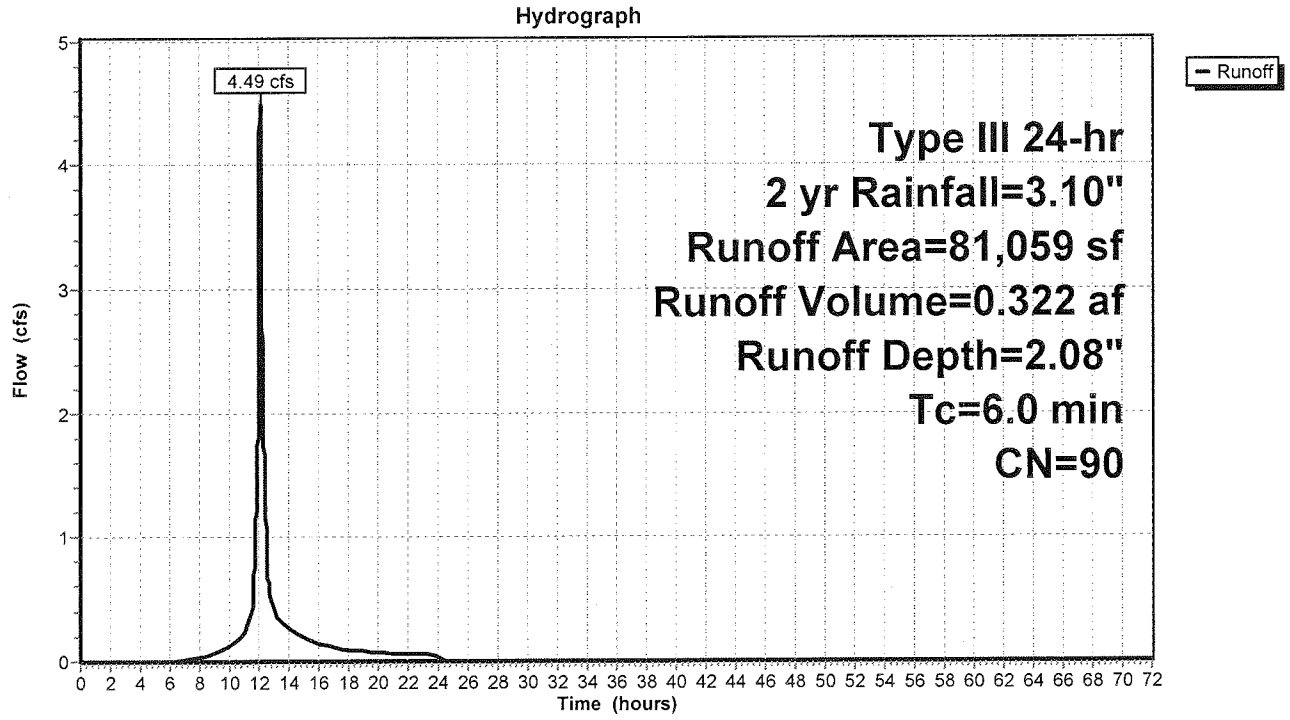
Runoff = 4.49 cfs @ 12.09 hrs, Volume= 0.322 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	53,349	98	roof, paved, impervious
	27,710	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	27,710		34.18% Pervious Area
	53,349		65.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Pre-Development Condition



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre-Development Runoff Area=81,059 sf 65.82% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=90 Runoff=7.19 cfs 0.527 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.527 af Average Runoff Depth = 3.40"
34.18% Pervious = 0.636 ac 65.82% Impervious = 1.225 ac

Summary for Subcatchment 1S: Pre-Development Condition

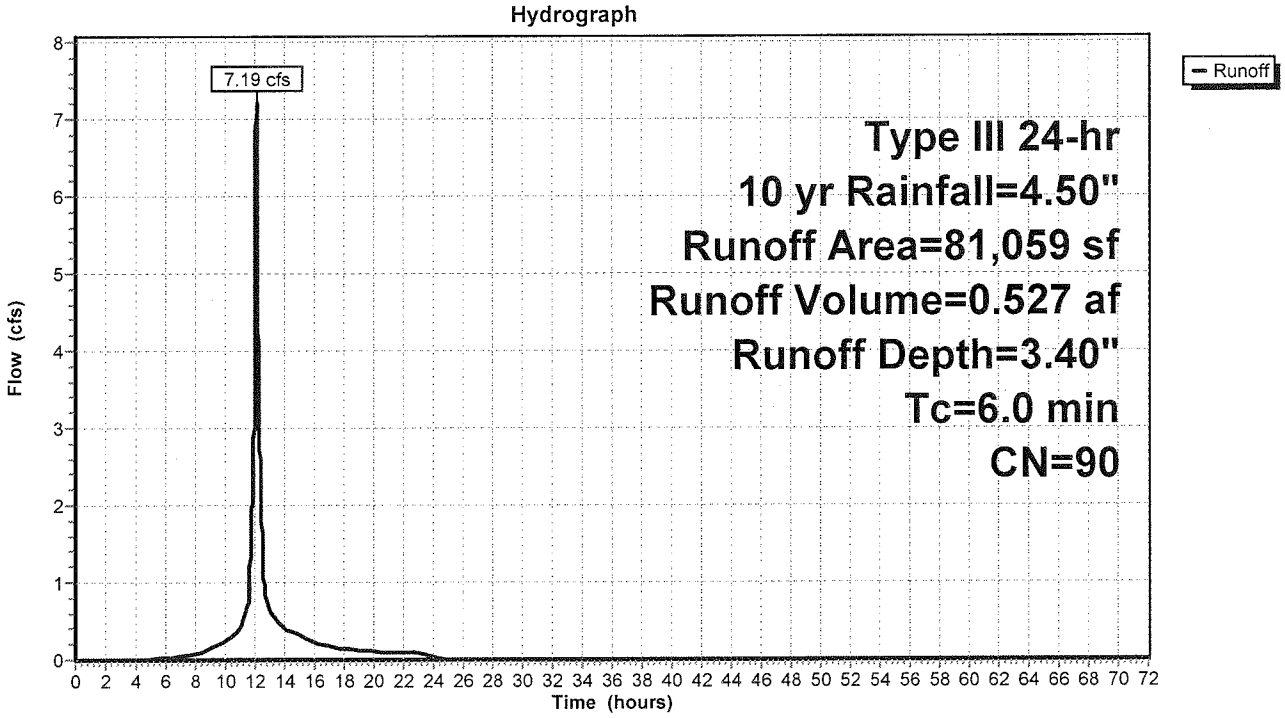
Runoff = 7.19 cfs @ 12.09 hrs, Volume= 0.527 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	53,349	98	roof, paved, impervious
	27,710	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	27,710		34.18% Pervious Area
	53,349		65.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Pre-Development Condition



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre-Development Runoff Area=81,059 sf 65.82% Impervious Runoff Depth=5.14"
Tc=6.0 min CN=90 Runoff=10.65 cfs 0.797 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.797 af Average Runoff Depth = 5.14"
34.18% Pervious = 0.636 ac 65.82% Impervious = 1.225 ac

Summary for Subcatchment 1S: Pre-Development Condition

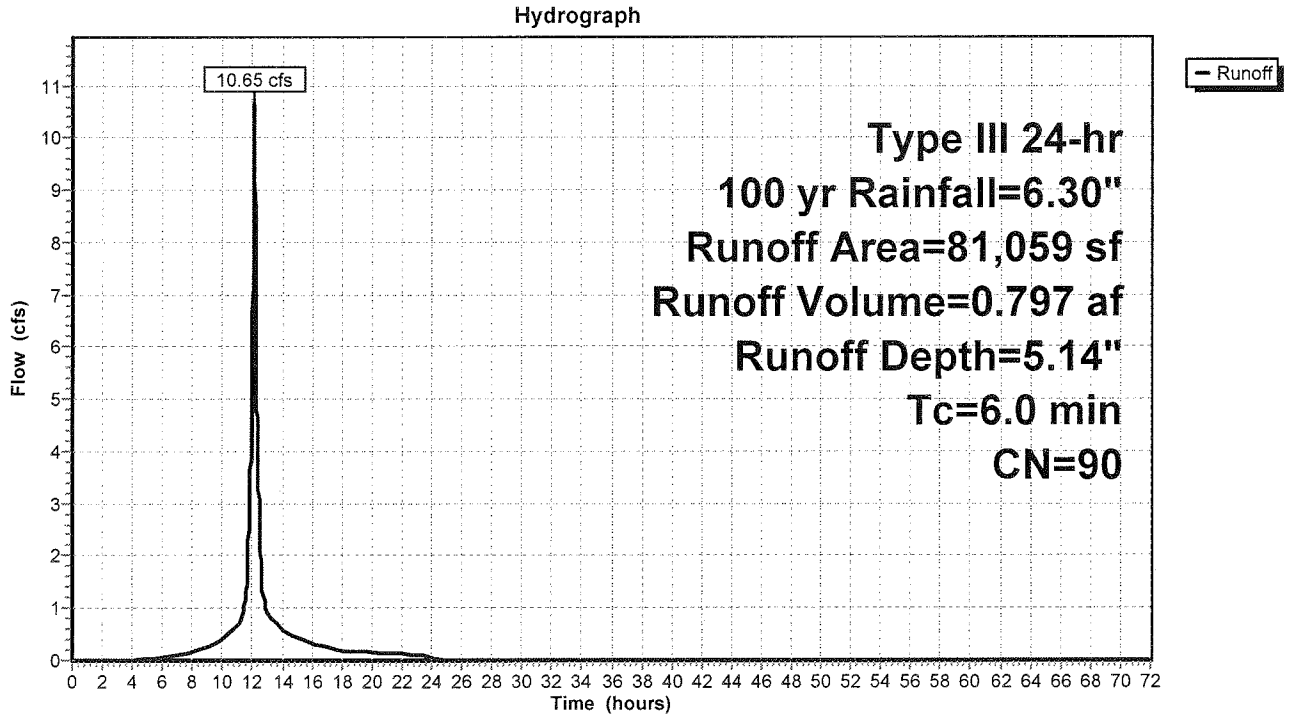
Runoff = 10.65 cfs @ 12.08 hrs, Volume= 0.797 af, Depth= 5.14"

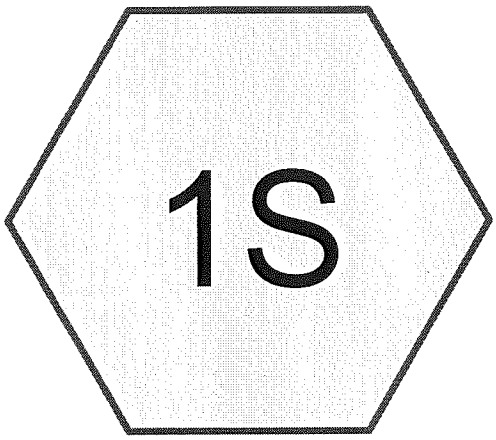
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.30"

	Area (sf)	CN	Description
*	53,349	98	roof, paved, impervious
	27,710	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	27,710		34.18% Pervious Area
	53,349		65.82% Impervious Area

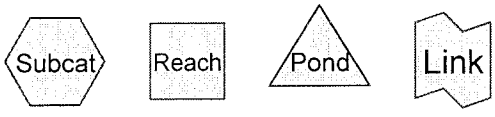
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Pre-Development Condition





Post-Development Condition



Routing Diagram for Post-Development
Prepared by {enter your company name here}, Printed 4/14/2016

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.585	74	>75% Grass cover, Good, HSG C (1S)
1.276	98	roof, paved, impervious (1S)
1.861	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.585	HSG C	1S
0.000	HSG D	
1.276	Other	1S
1.861		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.585	0.000	0.000	0.585	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	1.276	1.276	roof, paved, impervious	1S
0.000	**0.000**	**0.585**	**0.000**	**1.276**	**1.861**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Post-Development Runoff Area=81,059 sf 68.54% Impervious Runoff Depth=2.08"
Tc=6.0 min CN=90 Runoff=4.49 cfs 0.322 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.322 af Average Runoff Depth = 2.08"
31.46% Pervious = 0.585 ac 68.54% Impervious = 1.276 ac

Summary for Subcatchment 1S: Post-Development Condition

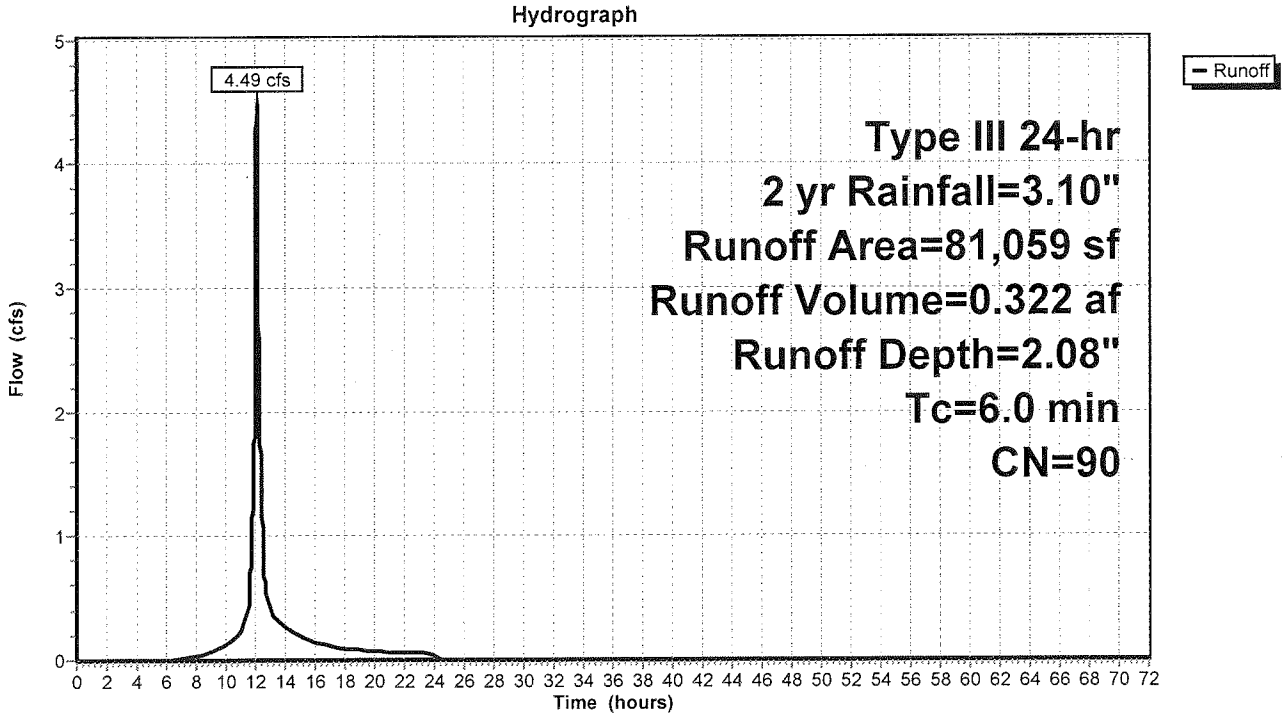
Runoff = 4.49 cfs @ 12.09 hrs, Volume= 0.322 af, Depth= 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.10"

	Area (sf)	CN	Description
*	55,561	98	roof, paved, impervious
	25,498	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	25,498		31.46% Pervious Area
	55,561		68.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Post-Development Condition



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Post-Development Runoff Area=81,059 sf 68.54% Impervious Runoff Depth=3.40"
Tc=6.0 min CN=90 Runoff=7.19 cfs 0.527 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.527 af Average Runoff Depth = 3.40"
31.46% Pervious = 0.585 ac 68.54% Impervious = 1.276 ac

Summary for Subcatchment 1S: Post-Development Condition

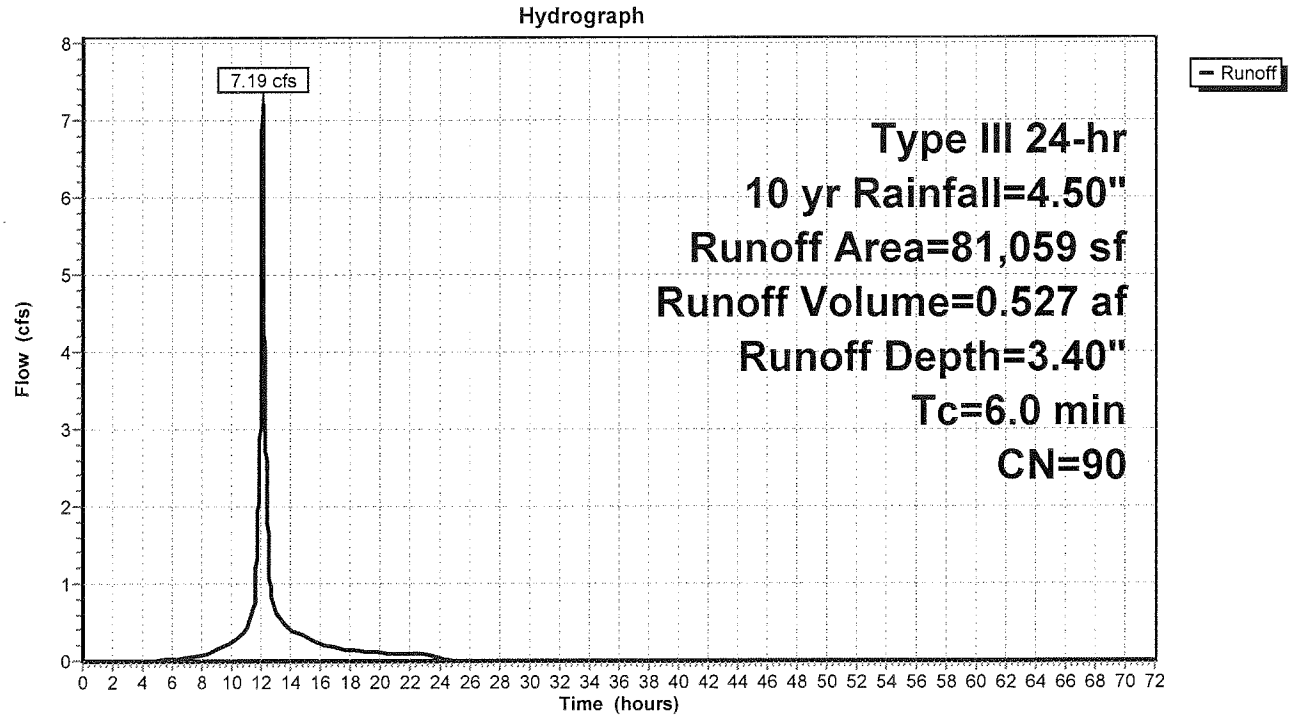
Runoff = 7.19 cfs @ 12.09 hrs, Volume= 0.527 af, Depth= 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=4.50"

	Area (sf)	CN	Description
*	55,561	98	roof, paved, impervious
	25,498	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	25,498		31.46% Pervious Area
	55,561		68.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Post-Development Condition



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Post-Development Runoff Area=81,059 sf 68.54% Impervious Runoff Depth=5.14"
Tc=6.0 min CN=90 Runoff=10.65 cfs 0.797 af

Total Runoff Area = 1.861 ac Runoff Volume = 0.797 af Average Runoff Depth = 5.14"
31.46% Pervious = 0.585 ac 68.54% Impervious = 1.276 ac

Summary for Subcatchment 1S: Post-Development Condition

Runoff = 10.65 cfs @ 12.08 hrs, Volume= 0.797 af, Depth= 5.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 yr Rainfall=6.30"

	Area (sf)	CN	Description
*	55,561	98	roof, paved, impervious
	25,498	74	>75% Grass cover, Good, HSG C
	81,059	90	Weighted Average
	25,498		31.46% Pervious Area
	55,561		68.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: Post-Development Condition